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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

XU, LING X

ART UNIT PAPER NUMBER

1775

DATE MAILED: 11/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/626,005

Applicant(s)

LYLES, MARK B.

Examiner

Ling X. Xu

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 14-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/7/03.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-13, drawn to a hybrid material, classified in class 428, subclass 304.4.
 - II. Claims 14-36, drawn to a method of making the hybrid material, classified in class 501, subclass 39.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be used to make other and materially different product such as infiltrating molten metal into the porous ceramic.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Ms. Michelle M. Lecoite on 6/17/2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-13. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-36 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 11 and 13, it is unclear if the claim should be recited that the hybrid material comprising at least 50% of the metal instead of the metal comprising at least 50% of the hybrid material.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Licari et al (US 3,983,270).

With respect to claims 1 and 6, Licari discloses a transition metal complex with metal such as Cr, Mn, Fe, Co, Ni or Al can chemically adheres to the wear surface comprising porous ceramic (col. 7, lines 40-67) and form a porosity-filling boundary.

Licari also discloses that the transition metal such as chromium is in its ionic form and can form a covalent bond with the porous ceramic wear surface (col. 6, lines 35-50).

With respect to claims 2-3, Licari discloses the ceramic surfaces consist of materials such as silicon and the alloys and carbides thereof, quartz (SiO_2), boron carbide, and metal oxides including aluminum oxide (col. 3, lines 40-55).

Accordingly, Licari meets all the limitations of claims 1-3 and 6.

4. Claims 1-2, 6-10 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Ritland et al. (US 5,614,043).

With respect to claims 1-2, Ritland discloses a metal-infiltrated ceramic material. The ceramic can be any ceramic such as alumina and mullite including silica (col. 3, lines 55-67). The ceramic is brought into contact with a molten metal and the molten metal enters the pore structure of the ceramic layer and fills substantially all of the open porosity (col. 5, lines 55-67).

The process of the metal covalently bonded to the ceramic of the present application involves the critical step of introducing metal into the void space of the ceramic and melt the metal particles by electric current or other heat sources to make the claimed hybride material with metal covalently bonded with the ceramic, see pages 11 and 17-18 of the specification. Ritland also discloses the same critical step of introducing the metal into the void space of the ceramic in the molten form, and the metal fills substantially all of the open pores of the ceramic. Therefore, the molten metal would also be able to form the same covalently bonded with ceramic as claimed.

With respect to claims 6-7, Ritland discloses that the metal can be copper or copper titanium alloy (col. 6, lines 1-55).

With respect to claims 8-10 and 12, Ritland discloses that the metal infiltrate substantially all of the void space of the ceramic through capillary action (col. 7, lines 1-30).

Accordingly, Ritland meets all the limitations of claims 1-2, 6-10 and 12.

Claim Rejections - 35 USC §102 or 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-10 and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Licari et al (US 3,983,270), as applied to claim 1 above, and further in view of the same reference.

As stated above, Licari discloses a transition metal complex such as Cr, Mn, Fe, Co, Ni or Al can chemically adheres to the wear surface comprising porous ceramic (col. 7, lines 40-67) and form a porosity-filling boundary. Therefore, the porous ceramic is considered substantially filling all the open pores (about 100%), or in the alternative, it would have been obvious to one of ordinary skill in the art to fill the pores as much as possible in order to provide a smooth and low porosity surface.

Claim Rejections - 35 USC § 103

6. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Licari or Ritland, as applied to claim 1 above, and further in view of Lyles (US 2001/0044159).

As stated above, Licari or Ritland discloses the same metal ceramic hybrid material as claimed.

Licari or Ritland does not disclose the porous ceramic material comprising the specific component as recited in claims 3-5.

Lyles teaches the porous ceramic can be 100% silica, or up to about 60% alumina. The silica can be up to about 50% cristobalite (right column, page 1).

Lyles also teaches that the ceramic material can be used as reinforcement agents for organic inorganic or metallic materials (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art to use these porous materials as claimed since these materials are more suitable to be used as reinforcement agents for organic, inorganic or metallic materials than other materials (page 1,[0001]), as taught by Lyles.

7. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Licari et al., as applied to claim 1 above, and further in view of the same reference.

As stated above, Licari discloses that same metal ceramic hybrid material as recited in claim 1.

Licari does not disclose the amount of the metal in the hybrid material as recited in claims 11 and 13.

However, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical.

“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955)

Therefore, it would have been obvious to one of ordinary skill in the art to provide sufficient and optimum amount of the metal in the claimed material by routine experimentation.

8. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ritland et al., as applied to claim 1 above, and further in view of the same reference.

As stated above, Ritland discloses that same metal ceramic hybrid material as recited in claim 1.

Ritland does not disclose the amount of the metal in the hybrid material as recited in claims 11 and 13.

However, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical.

“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235(CCPA 1955)

Therefore, it would have been obvious to one of ordinary skill in the art to provide sufficient and optimum amount of the metal in the claimed material by routine experimentation.

Art Unit: 1775

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 571-272-1546. The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah D. Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ling X. Xu
Examiner
Art Unit 1775